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EDITORIAL COMMENT

Epicardial fat as a predictor of COVID-19 disease severity: Just a surrogate for obesity or a true independent predictor?

A gordura epicárdica como fator preditivo da gravidade da doença COVID-19: apenas um marcador de obesidade ou um verdadeiro fator preditivo independente?

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Since it was first reported in China in 2019, COVID-19, the infection caused by the new coronavirus SARS-CoV-2, has become a global pandemic, with more than 500 million confirmed cases worldwide as of June 2022.[1] Health care systems around the world have been placed under tremendous strain by COVID-19, and the virus will likely leave lasting effects for years to come.

Fortunately, most people infected with the virus experience mild to moderate respiratory illness and recover without needing hospital admission. Some, however, become seriously ill with severe or critical disease following the development of an acute respiratory distress syndrome caused by systemic hyperinflammation and cytokine release.

Vaccination has had a major impact in reducing morbidity and mortality resulting from COVID-19 infection,[2] with billions of vaccine doses administered since the first approval in December 2020. Its long-term protection against severe infection is still not established, especially with the advent of new mutated strains, and there will likely be a need for regular vaccine boosts in years to come, particularly for higher-risk groups.

Multiple studies have demonstrated that comorbid cardiovascular disease and cardiovascular risk factors are linked to a more severe course and higher mortality from COVID-19.[3] Obesity, in particular, has been established as a risk factor for COVID-19 disease severity, with higher risk for hospitalization, intensive care unit (ICU) admission, invasive mechanical ventilation and death.[4] This may be due not only to the stronger association of obesity with cardiovascular risk factors (such as hypertension and type 2 diabetes) and cardiovascular disease (coronary artery disease and heart failure) – which by themselves are a risk factor for COVID-19 disease severity – but also to the proinflammatory state associated with obesity resulting from the release of various inflammatory molecules.[3,5] In the setting of COVID-19, obesity can therefore result in further inflammation and subsequent cytokine storm, increasing the risk of severe

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disease.[6] Epicardial adipose tissue is increased in obese people, and might also play a role in adverse outcomes.[7]

In their article published in this issue of the *Journal*,[8] Erdöl et al. report a single-center retrospective study that took place at Ankara City Hospital in Turkey, with data collected during an unspecified period. A total of 101 consecutive patients diagnosed with COVID-19 infection were enrolled (26 of them with severe or critical disease and admitted to the ICU). Clinical, laboratory and imaging (computed tomography [CT] scan) data were collected. The main objective was to assess the association between epicardial fat volume (EFV), inflammatory biomarkers (C-reactive protein, procalcitonin, serum ferritin, and interleukin-6) and prognosis (composite endpoint of death or admission to the ICU). Patients admitted to the ICU were significantly older and had a higher prevalence of comorbidities such as coronary artery disease and chronic obstructive pulmonary disease, compared to those with milder disease admitted to the ward (n=75). Demographic and clinical characteristics such as gender, body mass index, smoking and diabetes were not different between the groups. Inflammatory biomarkers were significantly more elevated in patients admitted to the ICU, and so was EFV. The authors[8] also found a moderate correlation between each of the inflammatory biomarkers and EFV (r=0.26-0.49). A cut-off value of 102 cm^3 for EFV was found to have a 94% negative predictive value for predicting more severe disease. On multivariate logistic regression analysis, EFV and age independently predicted admission to the ICU.

A recently published study by Mehta et al. also found that epicardial adipose tissue is a risk factor for severe COVID-19, independently of age, body mass index and comorbid conditions.[9]

Angiotensin-converting enzyme 2, recognized as a key receptor in the cell entry of SARS-CoV-2, has also been found in epicardial adipose tissue, further confirming this fat depot as a potential player in the pathophysiology of the disease. In the setting of COVID-19, epicardial adipose tissue may play a role in generating an imbalance between pro- and anti-inflammatory adipokines, potentially leading to the cytokine storm described in patients with severe COVID-19.[10]

Since most patients with severe COVID-19 will undergo a CT scan, with no need for gating, it is an easily accessible parameter that further helps in the risk stratification of these patients.

This paper has several limitations, mainly that it reports a single-center retrospective study with a small sample size. Furthermore, the results might have been different in the post-vaccination era, with many of the vaccinated patients admitted to the ICU with severe COVID-19 nowadays being those under chronic immunosuppression.

This study, however, contributes to current knowledge of the role of EFV in adverse outcomes, and to further risk stratification of COVID-19 patients.

Conflicts of interest

The author has no conflicts of interest to declare.

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